

MN3208

2048-STAGE LOW VOLTAGE OPERATION LOW NOISE BBD

General description

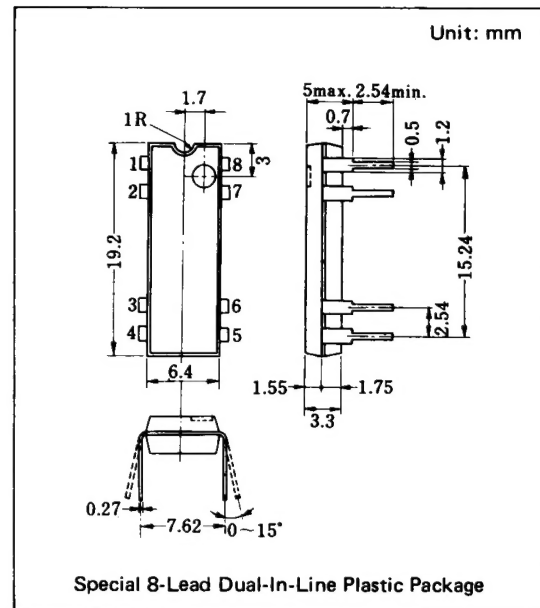
The MN3208 is a 2048-stage low voltage operation ($V_{DD} = 5V$) low noise BBD that provides a signal delay of up to 102.4ms and is suitable as a device for generation of reverberation effect of audio equipment such as stereo equipments.

Features

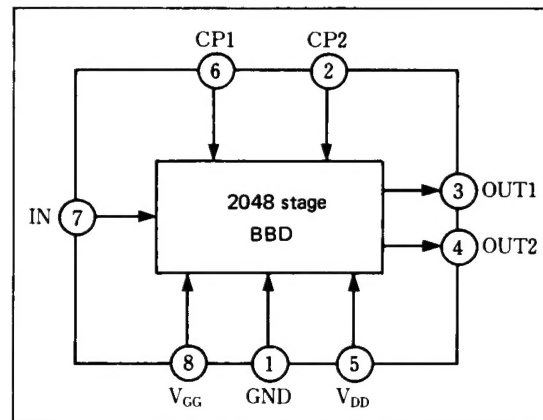
- Variable delay of audio signals: 10.24ms ~ 102.4ms.
- Wide supply voltage: 4 ~ 10V.
- Clock component cancellation capability.
- No insertion loss: $L_i = 0dB$ typ.
- Wide dynamic range: $S/N = 71dB$ typ.
- Low distortion: $THD = 0.5\%$ typ. ($V_i = 0.25V_{rms}$)
- N-channel silicon gate process.
- Special 8-lead dual-in-line plastic package.

Applications

- Reverberation and echo effects of audio equipment such as radio cassette recorder, car radio, portable radio, portable stereo, echo microphone and pre-taped musical accompaniment (Karaoke), etc.
- Sound effect in electronic musical instruments.
- Variable or fixed delay of analog signals.
- Telephone time compression and delay line for voice communication system.



Block Diagram



Quick Reference Data

Item	Symbol	Value	Unit
Supply Voltage	V_{DD}, V_{GG}	+ 5, $\frac{1}{3}V_{DD}$	V
Signal Delay Time	t_D	10.24~102.4	ms
Total Harmonic Distortion	THD	0.5	%
Signal to Noise Ratio	S/N	71	dB

■ Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Terminal Voltage	$V_{DD}, V_{GG}, V_{CP}, V_i$	$-0.3 \sim +11$	V
Output Voltage	V_o	$-0.3 \sim +11$	V
Operating Temperature	T_{opr}	$-20 \sim +60$	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55 \sim +125$	$^\circ\text{C}$

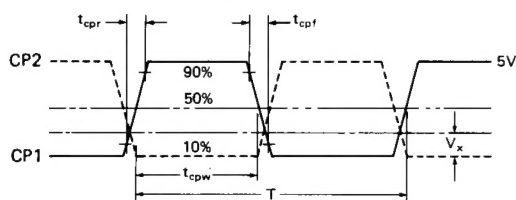
■ Operating Condition ($T_a = 25^\circ\text{C}$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain Supply Voltage	V_{DD}		+4	+5	+10	V
Gate Supply Voltage	V_{GG}			$\frac{14}{15} V_{DD}$		V
Clock Voltage "H" Level	V_{CPH}			V_{DD}		V
Clock Voltage "L" Level	V_{CPL}		0		+1	V
Clock Frequency	f_{CP}		10		100	kHz
Clock Pulse Width *1	t_{CPW}				$0.5T$ *2	
Clock Rise Time *1	t_{CPr}				500	ns
Clock Fall Time *1	t_{CPf}				500	ns
Clock Input Capacitance	C_{CP}				1400	pF
Clock Cross Point *1	V_X		0		$0.3V_{CPH}$	V

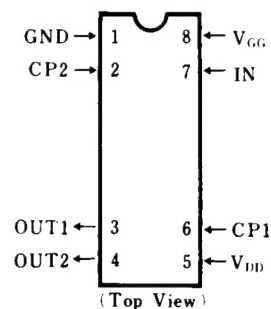
■ Electrical Characteristics ($T_a = 25^\circ\text{C}, V_{DD} = V_{CPH} = +5\text{V}, V_{CPL} = 0\text{V}, V_{GG} = \frac{14}{15} V_{DD}, R_L = 100\text{k}\Omega$)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t_D		10.24		102.4	ms
Input Signal Frequency	f_i	$f_{CP} = 40\text{kHz}, 3\text{dB down (0dB at } f_i = 1\text{kHz})$	9			kHz
Input Signal Swing	V_i	THD=2.5%	0.36			Vrms
Insertion Loss	L_i	$f_{CP} = 40\text{kHz}, f_i = 1\text{kHz}$	-4	0	4	dB
Total Harmonic Distortion	THD	$f_{CP} = 40\text{kHz}, f_i = 1\text{kHz}, V_i = 0.25\text{Vrms}$		0.5	2.5	%
Noise	V_{no}	$f_{CP} = 100\text{kHz}$ Weighted by "A" curve			0.3	mVrms
Signal To Noise Ratio	S/N			71		dB

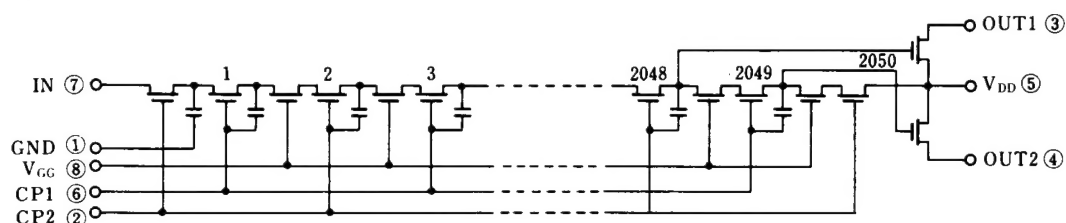
*1 Clock Pulse Waveforms

*2 $T = 1/f_{CP}$ (Clock Period)

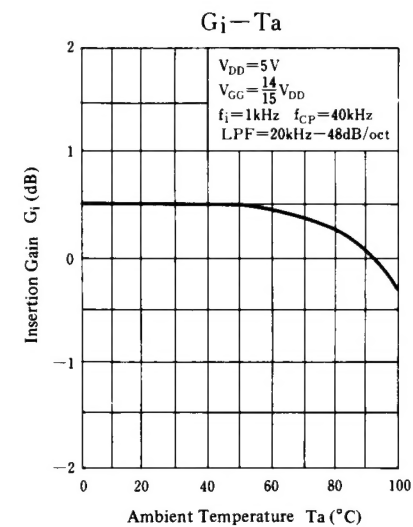
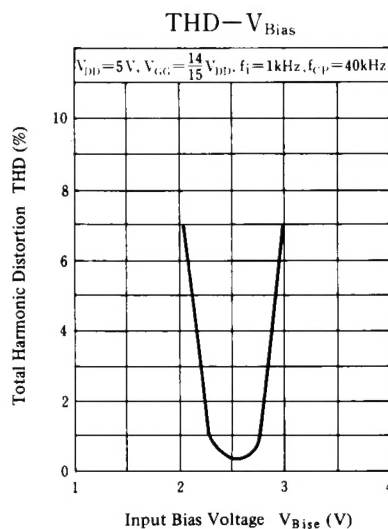
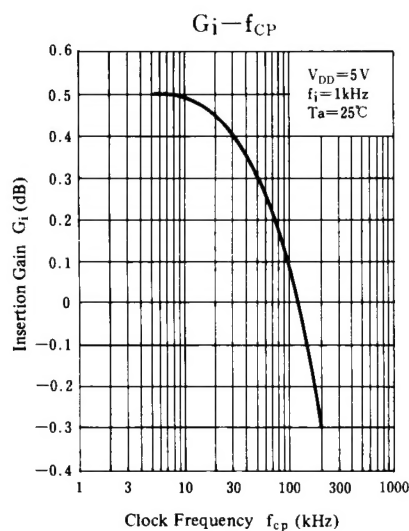
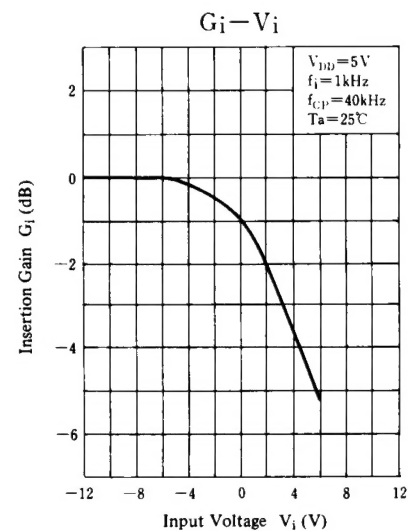
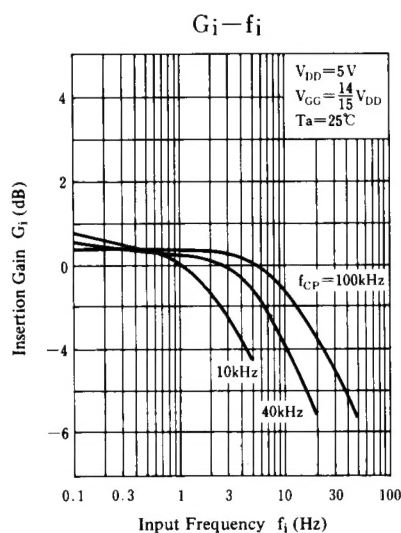
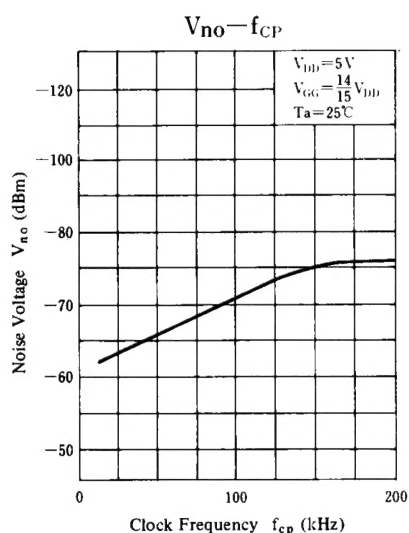
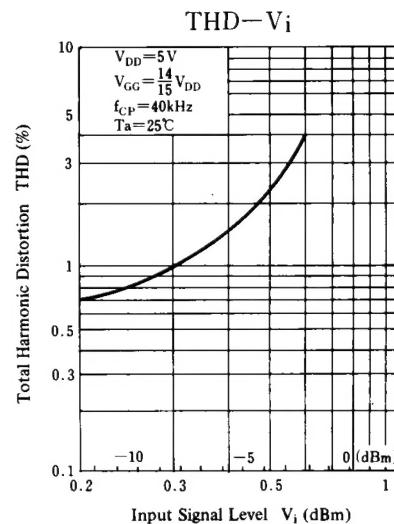
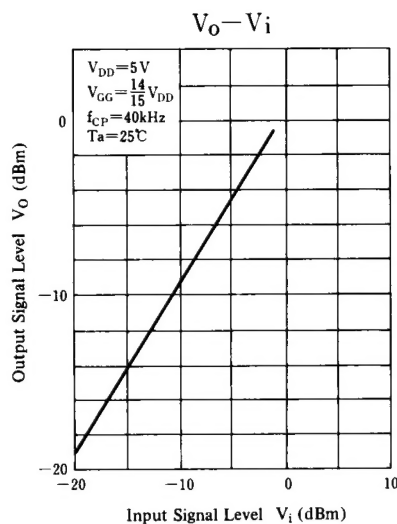
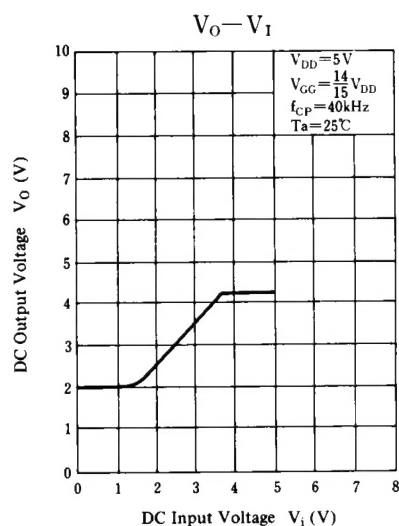
■ Terminal Assignments

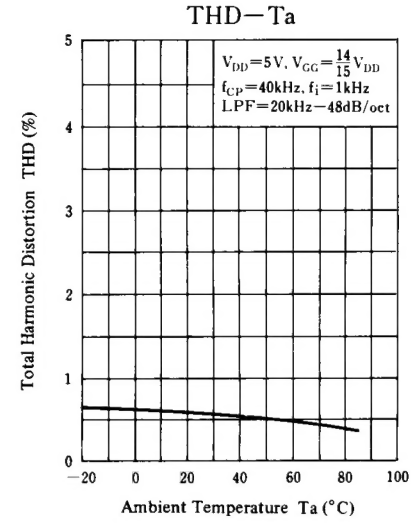
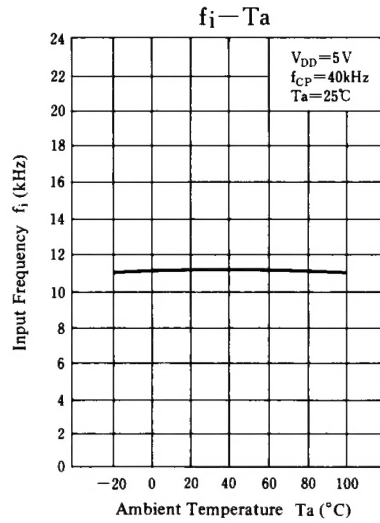
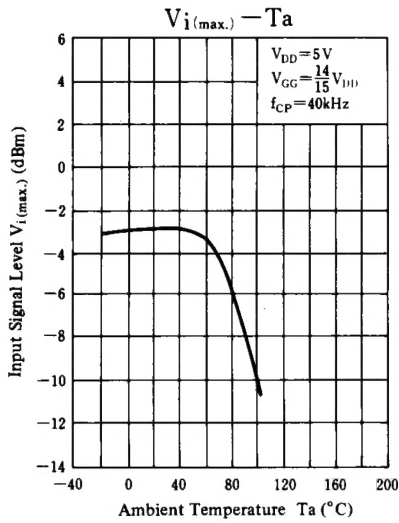


■ Circuit Diagram

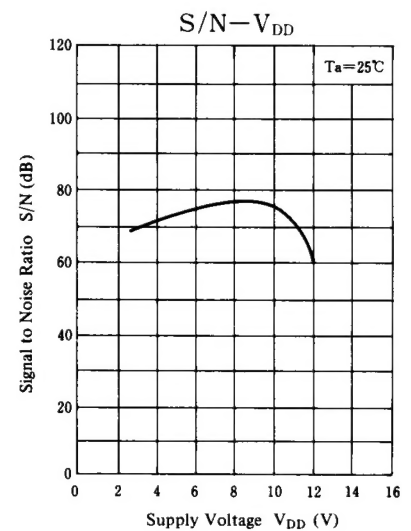
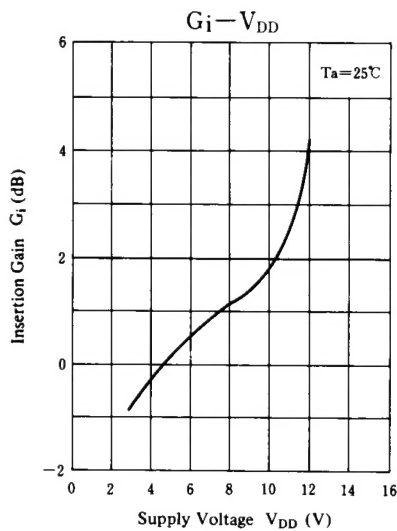
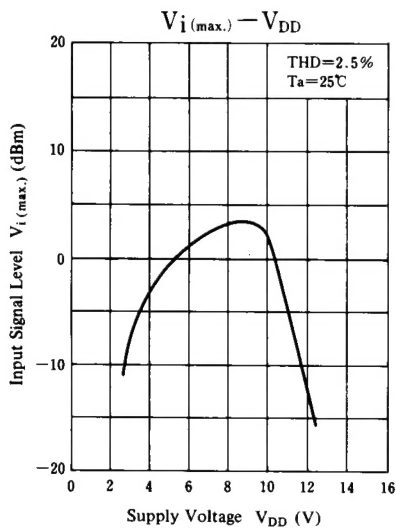
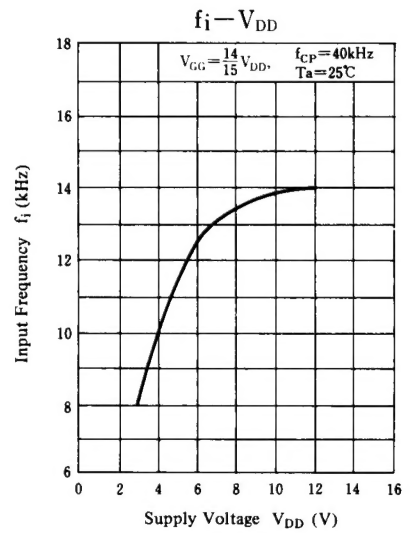
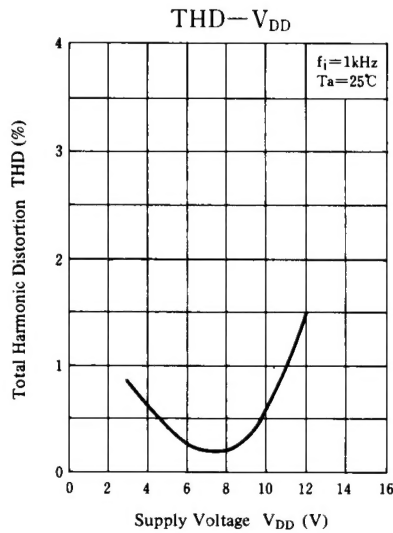
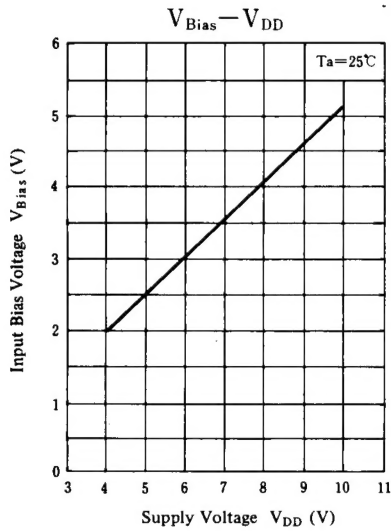


■ Typical Electrical Characteristic Curves

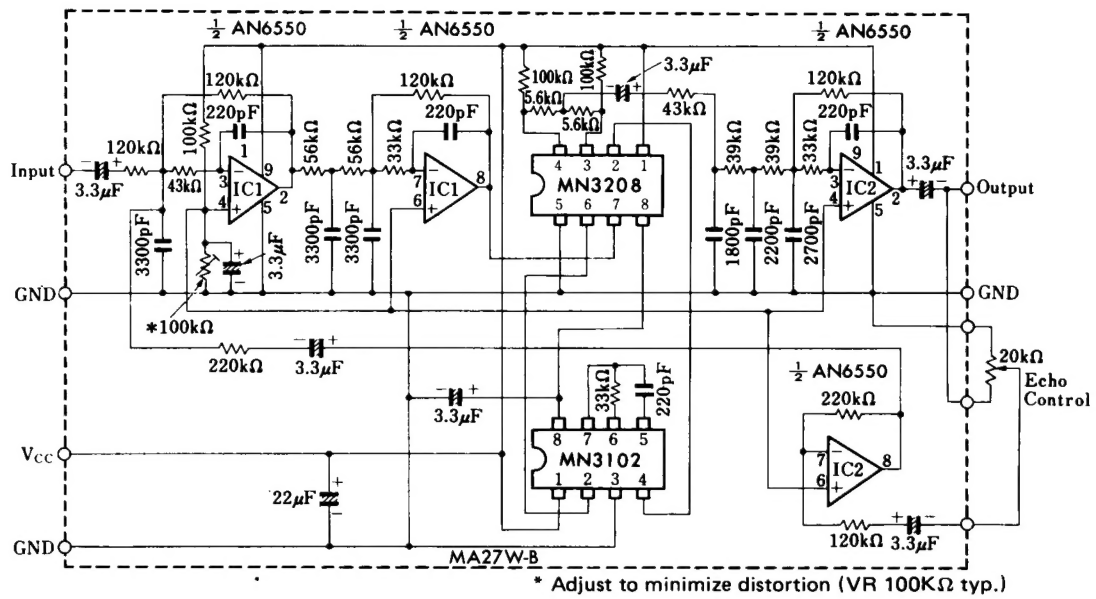




Supply Voltage Characteristics



■ Application Circuit



Reverberation Effect Generation Circuit (Signal Delay Over 100msec.)